REMARKS

Claims 7, 10, 13, 16, and 18 are objected to because of the following informalities. Claims 1-8 are rejected under U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-13 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koshio et al. (USPN 6,465,956). Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koshio et al. (USPN 6,465,956) in view of Nagano (USPN 6,031,329).

1. Introduction to the substitute specification:

2. A substitute specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b) is required. Further, the instant specification contains several misspelled words, such as in line 17 on page 10, "sinmultanelusly" is interpreted as "simultaneously." The substitute specification field must be accomplished by a statement that is contains no new matter.

3. The specification entered on 7-16-2001 is objected to because it lacks the proper headings.

Response:

A substitute specification has been provided to fit the bill as mentioned by the Examiner, and no new matter has been introduced into the present application. In general, changes have been made simply to correct

grammatical and idiomatic errors. Furthermore, the proper section headings have been added in the specification according to the Examiner's suggestion. Consideration of the substitute specification is politely requested.

2. Objections to the claims 7, 10, 13, 16, and 18:

4. Claims 7, 10, 13, 16, and 18 are objected to because of the following informalities: the common limitation in the claims, "...far from the ...sustaining electrode" is unclear. The Examiner is interpreting the limitation to read, "...not contiguous to the end of the...sustaining electrode". Appropriate correction is required.

Response:

Claims 7, 10, 13, 16, and 18 have been corrected in accordance with the Examiner's instructions. Reconsideration of the amended claims 7, 10, 13, 16, and 18 is therefore politely requested.

3. Rejections over claims 1-8 under 35 U.S.C. 112:

5. In regard to claim 1, lines 9-11 are unclear, specifically, the first and second sides of the first sustaining electrode are indeterminate. The examiner cannot ascertain the limitation wording, and is therefore relying mainly on the drawings to define the first and second sides of the first sustaining electrode to conduct a reasonable search for prior art. However, the Examiner suggests changing the wording of the limitation so one does not have to rely on the drawings to understand the definition of the first and second sides of the first sustaining electrode.

Claims 2-8 are included because of their dependency.

Response:

Claim 1 has been amended in the above AMENDMENT section to overcome this rejection. The unclear part of claim 1 about the first side and the second side of the first sustaining electrode has been canceled so as to clearly define the first sustaining electrode. Reconsideration of the amended claim 1 is therefore politely requested.

The amended claim 7 and the rejected claims 2-6 and 8 are allowed due to they are claim 1's dependency. Reconsideration of the rejection over claims 2-8 is therefore requested.

4. The advisory of the obligation under 37 CFR 1.56:

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(a) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Response:

All of the claims in this application are commonly

owned by the joint inventors. Applicants respectfully request the examiner to consider the application under this condition.

5. Rejections of claims 1-13 and 16-17 under 35 U.S.C. 103(a) :

7. In regard to claim 1, Koshio teaches in figures 1 and 2, an electrode structure of a plasma display panel with a first sustaining electrode (Xb) and a second sustaining electrode (Yb) set on the surface of the front substrate (10), and a first gap (shown below) existing between the first and second sustaining electrodes, the first sustaining electrode having a first side (shown below) approaching to the second sustaining electrode and a second side (shown below) far from the second sustaining electrode; and a first auxiliary electrode (Xa) electrically connected to the first sustaining electrode, the first auxiliary electrode comprising a first part (shown below) and a second part (shown below), the first part formed in the first gap (shown below) and the second part located above the first sustaining electrode; wherein a second gap (g) exists between the first part of the first auxiliary electrode and the second sustaining electrode, and the width of the part of the first auxiliary electrode and the second sustaining electrode, and the width of the second gap is smaller than the width of the first gap.

Koshio does not specifically disclose the second part of the auxiliary electrode is adjacent to the first side of the first sustaining electrode.

However, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to construct the second part of the auxiliary electrode adjacent to the first sustaining electrode, since it is well known in the art that modifying the edge of the auxiliary electrode to be adjacent to the first side of the first sustaining electrode is a design choice, and one of ordinary skill in the art will recognize that making the auxiliary electrode adjacent to the first side of the sustaining electrode will save on material, and will lower the overall cost of manufacturing.

In regard to claim 2, Koshio teaches all of the recited limitations of claim 1 (above). Koshio further teaches in figure 1 that the first auxiliary electrode further comprises a third comprises a third part (shown above) approaching to the second side of the first sustaining electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure according to claim 1 (above), further comprising a third part on the first auxiliary electrode which approaches the second side of the first sustaining electrode, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regard to claim 3, Koshio teaches all of the recited limitations of claim 1 (above). Koshio further teaches in figure 1 that the third part of the first auxiliary electrode is on the first sustaining

electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 2 (above), further comprising the third part of the first auxiliary electrode is on the first sustaining electrode, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regard to claim 4, Koshio teaches all of the recited limitations of claim 2 (above). Koshio further teaches in figure 1 that the third part of the first auxiliary electrode is on the surface of the front substrate.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 2 (above), further comprising the third part of the first auxiliary electrode is on the surface of the front substrate, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regard to claim 5, Koshio teaches all of the recited limitations of claim 2 (above). Koshio further teaches in figures 2 and 10 that a back substrate (figure 2, element 13) is parallel to the front substrate and a plurality of ribs (figure 10, element 35b) formed on the back substrate and parallel to each other, and the plurality of ribs are perpendicular to the first auxiliary electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 2 (above), further comprising a plurality of ribs formed on the back substrate and parallel to each other but perpendicular to the first auxiliary electrode, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regard to claim 6, Koshio teaches all of the recited limitations of claim 5 (above). Koshio further teaches in figures 2 and 10 that the first auxiliary electrode further comprises a fourth part parallel to the ribs.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 2 (above), further comprising a plurality of ribs formed on the back substrate and parallel to each other but perpendicular to the first auxiliary electrode, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regard to claim 7, Koshio teaches all of the recited limitations of claim 2 (above). Koshio further teaches in figure 2 that the second sustaining electrode comprises a third side (the edge of Yb') which is not contiguous to the first sustaining electrode, and the electrode structure also comprises a second auxiliary electrode (Ya) approaching to the third side of the

second sustaining electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 2 (above), further comprising a third side on the second sustaining electrode which is not contiguous to the first sustaining electrode, and the electrode structure also comprises a second auxiliary electrode (Ya) approaching to the third side of the second sustaining electrode, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regard to claim 8, Koshio teaches all of the recited limitations of claim 2 (above). Koshio further teaches in column 7 lines 47-50 and 58-67 that the first and the second sustaining electrodes are defined and patterned by a first lithographic process, and the first auxiliary electrode is defined and patterned by a second lithographic process.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 2 (above), further comprising the first and the second sustaining electrodes are defined and patterned by a first lithographic process, and the first auxiliary electrode is defined and patterned by a second lithographic process, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regards to claim 9, Koshio teaches in figures

1 and 2, an electrode structure of a plasma display panel with a first sustaining electrode (Xb) and a second sustaining electrode (Yb) formed on the front substrate (10), and a first gap (shown above) existing between the first and second sustaining electrodes, and a first auxiliary electrode (Xa) formed on the surface of the substrate in the first gap; wherein a second gap (g) exists between the first auxiliary electrode and the second sustaining electrode.

Koshio does not specifically disclose a width of the second gap is smaller than the width of the first gap.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electrode structure to claim 9, further wherein the second gap is smaller than the width of the first gap, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regards to claim 10, Koshio teaches all of the recited limitations of claim 9 (above). Koshio further teaches in figure 1 that the first sustaining electrode comprises a first side approaching to the second sustaining electrode and a second side far from the second sustaining electrode, the first auxiliary electrode comprises a first part and a second part, the first part is formed in the first gap, and the second part is located approaching to the second side of the first sustaining electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention

was made to construct an electrode structure to claim 9 (above), further comprising a first sustaining electrode comprises a first side approaching to the second sustaining electrode and a second side far from the second sustaining electrode, the first auxiliary electrode comprises a first part and a second part, the first part is formed in the first gap, and the second part is located approaching to the second side of the first sustaining electrode., since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regards to claim 11, Koshio teaches all of the recited limitations of claim 10 (above). Koshio further teaches in figure 1 that the second part of the first auxiliary electrode is formed above the first sustaining electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 10 (above), further where the second part of the first auxiliary electrode is formed above the first sustaining electrode, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regards to claim 12, Koshio teaches all of the recited limitations of claim 10 (above). Koshio further teaches in figure 1 that the second part of the first auxiliary electrode is formed on the surface of the front substrate.

Therefore, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 10 (above), further comprising the second part of the first auxiliary electrode is formed on the surface of the front substrate, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regards to claim 13, Koshio teaches all of the recited limitations of claim 9 (above). Koshio further teaches in figure 1 that the second sustaining electrode comprises a third side far from the first sustaining electrode, and the electrode structure further comprises a second auxiliary electrode approaching to the third side of the second sustaining electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 10 (above), further according to claim 13, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regards to claim 16, Koshio teaches all of the recited limitations of claim 9 (above). Koshio further teaches in figure 1 that the first sustaining electrode comprises a first side approaching to the second sustaining electrode and a second side far from the second sustaining electrode, and the first auxiliary electrode is formed on the surface of the front substrate and adjacent to the first side of the first sustaining electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 9 (above), further according to claim 16; since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

In regards to claim 17, Koshio teaches in figures 1 and 2, an electrode structure of a plasma display panel with a first sustaining electrode (Yb) formed on the surface of the front substrate; a first auxiliary electrode (Xa) formed on the surface of the front substrate and parallel to the first sustaining electrode (Yb), a first gap existing between the first sustaining electrode and the first auxiliary electrode; and a second auxiliary electrode (Ya) formed on the surface of the front substrate and parallel to the first sustaining electrode, a second gap existing between the first sustaining electrode (Yb) and the second auxiliary electrode (Ya), and the width of the second gap being smaller than the width of the first gap

Koshio does not specifically disclose a width of the second gap.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct an electrode structure to claim 9(above), further wherein the second gap is smaller than a width of the first gap, since Koshio teaches this configuration improves the fineness for a picture being displayed on the panel (column 2, lines 32-33).

Response:

Claim 1 has been amended for greater consistency with the detailed description, and to more clearly differentiate over the cited prior art. No new matter has been introduced by this amendment. The amended claim 1 is repeated below, in clean format, for reference:

> "1. (Once amended) An electrode structure of a plasma display panel (PDP), the electrode structure formed on a front substrate of the PDP, and comprising:
>
> a first sustaining electrode and a second sustaining electrode set on the surface of the front substrate, and a first gap existing between the first and second sustaining electrodes; and
>
> a first auxiliary electrode electrically connected to the first sustaining electrode, the first auxiliary electrode comprising a first part and a second part ***adjacent to the first part***, the first part formed in the first gap, and the second part located above the first sustaining electrode;
>
> wherein a second gap existing between the first part of the first auxiliary electrode and the second sustaining electrode ***is used as a discharge gap of the electrode structure of the PDP***, and the width of the second gap is smaller than the width of the first gap."

As disclosed in the amended claim 1 and Fig. 4D, the present application provides an electrode structure mainly comprising two sustaining electrodes 34 and 36,

and an auxiliary electrode 40. Specifically, the auxiliary electrode 40 includes a first part 40a formed on the surface of the front substrate 32 in the first gap 38 defined between the two sustaining electrodes 34 and 36, and a second part 40b formed adjacent to the first part 40a and on the sustaining electrode 34. Therefore, *a second gap 48 is defined between the first part 40a of the auxiliary electrode 40 and the sustaining electrode 36.* Since the second gap 48 is smaller than the first gap 38, *the second gap 48 can be used as a discharge gap of the electrode structure of the PDP* to improve the image quality of the PDP (page 6, lines 11-15).

As disclosed in Fig.1 of Koshio's invention, Koshio et al. have mentioned a row electrode pair (X,Y), each *row electrode X includes a plurality of T-shaped transparent electrode (Xa) consisting of a transparent electrically conductive film made of ITO*, and an *elongated bus electrode (Xb) consisting of a metal film* which is connected with one end of each T-shaped transparent electrode (Xa) (col. 7, lines 26-34). In this office action, the Examiner considers that Koshio's elongated bus electrode (Xb) is the sustaining electrode 34 of the present application, and Koshio's T-shaped transparent electrode (Xa) is the auxiliary electrode 40 of the present application (Part of paper No. 5, page 5, lines 4-8). However, in the background of the present application have taught that *the sustaining electrodes 34 and 36 are transparent and composed of indium tin oxide (ITO)*, and *the auxiliary electrode 40 is opaque and composed of Cr/Cu/Cr metal*

layers typically (page 2, lines 15-16, and 18-19). Therefore, the applicants believe that the Examiner might misunderstand the present application and *the sustaining electrode of the present application should be the T-shaped transparent electrode (Xa) of Koshio's invention, and the auxiliary electrode of the present application should be the elongated bus electrode (Xb) of Koshio's invention.*

For this reason, Koshio's gap defined between the auxiliary electrode (Xb) and the sustaining electrode (Ya) is not smaller than Koshio's gap (g, Fig.1 of Koshio's invention) defined between the sustaining electrodes (Xa,Xb) as taught in the amended claim of the present application. That is to say, the second gap 48 defined between the first auxiliary electrode 40 and the second sustaining electrode 36 can be used as the discharge gap of the electrode structure of the present application (claim 1, Fig.4), but *Koshio's gap defined between the auxiliary electrode (Xb) and the sustaining electrode (Ya) can not be used as the discharge gap of Koshio's invention*.

Furthermore, the auxiliary electrode 40 of the present application includes a first part 40a formed in the first gap 38, and a second part adjacent to the first part and located above the first sustaining electrode 34 (claim 1, Fig.4D). However, Koshio's elongated bus electrode (Xb) is not formed in the gap defined between the T-shaped transparent electrodes (Xa,Ya).

In addition, if the applicants believe that the Examiner's opinions that the sustaining electrode of the present application should be the T-shaped transparent electrode *(Xb,Yb)*, and the auxiliary electrode of the present application should be the elongated bus electrode *(Xa)* (Part of paper No. 5, page 5, lines 4-8), Koshio's discharge gap is still not defined between the electrodes (Xa,Yb) as taught by the present application.

For the above-mentioned reasons, the applicants believe the amended claim 1 is substantially different from Koshio's invention. Reconsideration of the amended claim 1 is respectively requested.

The amended claim 9 has all of the limitations of the amended claim 1. Likewise, the amended claim 17 has all of the limitations of the amended claim 1. Therefore, reconsideration of the amended claims 9 and 17 is politely requested.

The amended claim 7 and the rejected claims 2-6 and 8 are allowed due to they are claim 1's dependency. Likewise, the amended claims 10, 13, and 16 and the rejected claims 11-12 and are allowed due to they are claim 9's dependency. Reconsideration of the rejection over claims 2-8, 10-13, and 16 is therefore requested.

6. Rejections over claims 14 and 18 under 35 U.S.C. 103(a):

8. In regards to claim 14, Koshio teaches all of the recited limitations of claim 9 (above).

Koshio is silent to the electrode comprising a third auxiliary electrode.

However, Nagano teaches in figure 1 an electrode structure for a plasma display panel comprising a third auxiliary electrode located in a first gap, and a third gap existing between a third auxiliary electrode and a first sustaining electrode; wherein the width of the third gap is smaller than the width of the first gap.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electrode structure according to claim 17 (above), further with a third auxiliary electrode located in a first gap, and a third gap existing between a third auxiliary electrode and a first sustaining electrode further wherein the width of the third gap is smaller than the width of the first gap, since Nagano teaches in column 3 lines 39-42 that this configuration with a third auxiliary electrode improves light emission construct without encountering a significant increase in the power dissipation and heat generation.

In regards to claim 18, Koshio teaches all of the recited limitations of claim 17 (above). Koshio further teaches in figure 1 that the first sustaining electrode comprises a first side approaching to the second auxiliary electrode and a second side not contiguous to the end of second auxiliary electrode.

Koshio is silent to the electrode structure comprising a third auxiliary electrode.

However, Nagano teaches in figure 1 an electrode structure for a plasma display panel comprising a third

auxiliary electrode adjacent to the second side of the first sustaining electrode.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electrode structure according to claim 17 (above), further with a third auxiliary electrode adjacent to the second side of the first sustaining electrode, since Nagano teaches in column 3 lines 39-42 that this configuration with a third auxiliary electrode improves light emission contrast without encountering a significant increase in the power dissipation and heat generation.

Response:

Claim 14 is allowed due to it is claim 9's dependency. Likewise, and claim 18 is allowable due to it is claim 17's dependency. Reconsideration of the rejection over claims 14 and 18 is therefore requested.

7. Allowable subject matter:

9. Claims 15, 19, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In regard to claim 15, the best prior art of record fails to motivate or disclose a structure according to claim 14 wherein the first auxiliary electrode is electrically connected to the first sustaining electrode, and the third auxiliary electrode is electrically connected to the second sustaining electrode.

In regard to claim 19, the best prior art of record fails to motivate or disclose a structure according to claim 18 wherein a connecting electrode is formed between the first and the second auxiliary electrode.

In regard to claim 20, the best prior art of record fails to motivate or disclose a structure according to claim 18 wherein a fourth auxiliary electrode is formed on the surface of the front substrate.

Response:

Claim 15 was noted to have allowable subject matter by the Examiner, therefore is no longer in need of consideration. Furthermore, claims 18 and 19 have been amended for grammatical purposes only. No new matter has been introduced into the amended claims 18 and 19. And that claims 18 and 19 were noted to have allowable subject matter by the Examiner. Reconsideration of the amended claims 18 and 19 is therefore politely requested.

8. Introduction to claim 21:

New claim 21 is dependent upon the amended claim 1. No new matter is introduced by the new claim 21, support for which can be found in the Detailed Description and the Figures, especially with reference to items 341 and 342. Claim 21 should be allowed if the amended claim 1 is allowed. Consideration of claim 21 is therefore politely requested.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the specification:

1. Paragraphs beginning at line 1 of page 1 to line 22 of page 1 have been amended as follow:

--ELECTRODE STRUCTURE OF A PLASMA DISPLAY PANEL

BACKGROUND OF THE INVENTION

2. Field of the Invention

The present invention relates to an electrode structure of a plasma display panel (PDP), and more particularly, to an electrode structure of a PDP with a small discharge gap.

2.Description of the P[p]rior A[a]rt

A plasma display panel (PDP) is one kind of flat display using gas discharges to create brilliant images. Advantages of the PDP include thin and lightweight design, large display size, and wide viewing angle. The luminescent principle of the PDP involves the production of ultraviolet (UV) rays by plasma first, followed by irradiation of the UV rays to produce visible light. The production efficiency of plasma greatly influences the luminescent efficiency of the PDP. The luminescent efficiency of the PDP can be improved by many methods. For example, increasing UV production can improve the luminescent efficiency of the PDP, but increasing the luminescent efficiency of the fluorescence material is difficult. Nowadays, change of the filling gas and the electrode structure of the

PDP will increase the UV production.--

2. Paragraphs beginning at line 20 of page 3 to line 24 of page 3 have been amended as follow:

--BRIEF SUMMARY OF THE INVENTION

An objective of the present invention is to provide an electrode structure of a plasma display panel with a reduced discharge gap.--

3. Paragraphs beginning at line 26 of page 5 to line 11 of page 13 have been amended as follow:

--DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Please refer to Fig.4A to Fig.4G, which are the cross-sectional views of the electrode structures of a PDP 30 in the present invention. As shown in Fig.4A, the electrode structure is formed on a front substrate 32 of the PDP 30. The electrode structure includes a first sustaining electrode 34, a second sustaining electrode 36, a first auxiliary electrode 44, and a second auxiliary electrode 42. The first sustaining electrode 34 and second [36] sustaining electrode[s] 36 are formed on the surface of the front substrate 32 and a first gap 38 is defined between these electrodes. In addition, the first auxiliary electrode 44 has a first part 44a formed on the surface of the front substrate 32 in the first [discharge] gap 38, a second part 44b formed above the first sustaining electrode 34, and a third part 44c for connecting the first part

44a and the second part 44b. The second auxiliary electrode 42 is formed above the second sustaining electrode 36. A second gap 48 is defined between the first part 44a of the first auxiliary electrode 44 and the second sustaining electrode 36 and the second gap 48 is a discharge gap. As shown in the top view, the first sustaining electrode 34 and the second [36]sustaining electrode[s] 36 are parallel to the first auxiliary electrode 44 and the second[42] auxiliary electrode[s] 42.

Besides, the PDP 30 also includes a back substrate (not shown) parallel to the front substrate 32. A plurality of ribs 50 are formed on the back substrate, parallel to and spaced apart from each other with equal distance. A third part 44c of the first auxiliary electrode 44 is perpendicular to the first sustaining electrode 34 and the second [36]sustaining electrode[s] 36, and parallel to the ribs 50. Further, the third part 44c of the first auxiliary electrode 44 is in opposition to the ribs 50 on the back substrate to avoid the reduction of the transparency of the PDP 30.

The first sustaining electrode 34 and second[36] sustaining electrode[s] 36 are transparent electrodes and formed of indium tin oxide (ITO). The resistance of ITO is very large and easily affects the discharge efficiency. Therefore, an auxiliary electrode composed of Cr/Cu/Cr alloy is used to reduce the resistance. Moreover, a smaller discharge gap 48 is formed between[y] the sustaining electrode 36 and the first part 44a of the auxiliary electrode 44 in the first gap 38 so that

the [the] problem in the prior art can be solved by reducing the firing voltage to increase the quality of the PDP 30.

As shown in Fig.4B, the difference between Fig.4B and Fig.4A is the position of the second part 44b of the first auxiliary electrode 44. In Fig. 4B, the second part 44b is located on the surface of front substrate 32 rather than on the sustaining electrode 34 in Fig. 4A. As well, the second part 44b of the first auxiliary electrode 44 can be located on both surfaces of the first sustaining electrode 34 and the front substrate 32.

As shown in Fig.4C, the first part 44a of the first auxiliary electrode 44 can be formed in the first gap 38 and adjacent to the first sustaining electrode 34. As a result, the distance between the first auxiliary electrode 44 and the second sustaining electrode 36 is shortened to a second gap 48. The second gap 48 is smaller than the first gap 38 for achieving the objective of reducing the firing voltage in the present invention.

As shown in Fig.4D, the front substrate 32 of the PDP 30 includes an electrode structure having a first sustaining electrode 34, a second sustaining electrode 36, and a first auxiliary electrode 40. The [first 34 and the second 36 sustaining electrodes] <u>first sustaining electrode 34 and the second sustaining electrode 36</u> are formed on the surface of the front substrate 32, and a first gap 38 is defined there between. The first auxiliary electrode 40 is electrically

connected to the first sustaining electrode 34. The first sustaining electrode 34 includes a first side 341 and a second side 342, the first side 341 is near the second sustaining electrode 36, and the second side 342 is far away from the second sustaining electrode 36. Besides, the first auxiliary electrode 40 includes a first part 40a, a second part 40b, and a third part 40c. The first part 40a is formed on the surface of the front substrate 32 in the first gap 38, the second part 40b is formed on the first sustaining electrode 34 adjacent to the first side 341, and the third part 40c is positioned near the second side 342 of the first sustaining electrode 34. The first auxiliary electrode 40 and the second sustaining electrode 36 are separated by a second gap 48. The width of the second gap 48 is smaller than that of the first gap 38 for achieving the purpose of voltage reduction in the present invention. The third part 40c of the first auxiliary electrode 40 is formed above the first sustaining electrode 34 and approaching to the second side 342 of the first sustaining electrode 34. The third part 40c of the first auxiliary electrode 40 can also be positioned on the surface of the front substrate 32 (not shown), or above the first sustaining electrode 34 and the front substrate 32 at the same time. The first auxiliary electrode 40 also includes a fourth part 40d positioned between the second part 40b and the third part 40c. The position of the fourth part 40d is opposite to the ribs 50 on the back substrate (not shown), so the transparency of the PDP 30 will not be reduced by the fourth part of the auxiliary electrode 40d. In addition, each part of the first

auxiliary electrode 40 can be electrically connected. A second auxiliary electrode 42 is also formed above the second sustaining electrode 36 to reduce the resistance of the second sustaining electrode 36.

As shown in Fig.4E, the first auxiliary electrode 40 includes only the first part 40a and the second part 40b. The first part is formed in the first gap 38, and the second part 40b is located above the first sustaining electrode 34 and adjacent to the first side 341 of the first sustaining electrode 34. Both the third 40c and fourth part 40d are omitted in this embodiment to increase the transparency of the entire front substrate 32.

As shown in Fig.4F, a first auxiliary electrode 44 and a third [45]auxiliary electrode[s] 45 are positioned between the [first 34 and the second 36 sustaining electrode] first sustaining electrode 34 and the second sustaining electrode 36. The first auxiliary electrode 44 electrically connects to the first sustaining electrode 34 via a connecting electrode 52a and the third auxiliary electrode 45 electrically connects to the second sustaining electrode 36 via a connecting electrode 52b. A first gap 38 is defined between the [first 34 and the second 36 sustaining electrode] first sustaining electrode 34 and the second sustaining electrode 36. The first auxiliary electrode 44 and the third [45] auxiliary electrode[s] 45 are both located on the first gap 38. A second gap 48 is defined between the first auxiliary electrode 44 and the second sustaining electrode 36,

and a third gap 46 is defined between the third auxiliary electrode 45 and the first sustaining electrode 43. The widths of the third gap 46 and the second gap 48 are both smaller than that of the first gap 38 formed by the [first 34 and the second 36 sustaining electrode] first sustaining electrode 34 and the second sustaining electrode 36. Therefore, the purpose of reducing the firing voltage of the PDP 30 is again achieved.

As shown in Fig.4G, two L-sharp [first 34 and the second 36 sustaining electrode] first sustaining electrode 34 and second sustaining electrode 36 are formed in opposition to each other on the surface of the front substrate 32. A first gap 38 is further defined between the [first 34 and the second 36 sustaining electrode] first sustaining electrode 34 and the second sustaining electrode 36. A first auxiliary electrode 44 is formed on the surface of the front substrate 32 in the first discharge gap 38 and the first auxiliary electrode 44 is formed adjacent to the first sustaining electrode 34. In addition, a second auxiliary electrode 42 is formed on the surface of the second sustaining electrode 36. The second sustaining electrode 36 has different distances to the first auxiliary electrode 44 for forming a second gap 48 and a third gap 58, respectively. The first auxiliary electrode 44 is electrically connected to the first sustaining electrode 34 and the second auxiliary electrode 42 is electrically connected to the second sustaining electrode 36. The second gap 48 and the third gap 58 are both smaller than the first gap 38. Therefore, the smaller discharge gaps 48, 58 can be used to reduce

the firing voltage of the PDP 30. In addition, the first auxiliary electrode 44 can be [sinmultanelusly] simultaneously arranged on the surface of the front substrate 32 as well as on the first sustaining electrode 34.

In this embodiment, two lithographic processes are used to form these sustaining electrodes 34, 36 and these auxiliary electrodes 40,44, 42, respectively. Therefore, a smaller discharge gap 58 is obtained by properly arranging the relative position of these auxiliary electrodes 40, 42, 44 and these sustaining electrodes 34, 36.

Please refer to Fig.5A and Fig.5B. Fig.5A and Fig.5B are the cross-sectional views of another embodiment of a PDP 60 according to the present invention. As shown in Fig.5A, the PDP 60 has a front substrate 62 and an electrode structure including a sustaining electrode 64, a first auxiliary electrode 66, a second auxiliary electrode 68, and a third auxiliary electrode 70. The sustaining electrode 64 is formed on the surface of the front substrate 62. The first auxiliary electrode 66 is also formed on the surface of the front substrate 62 and parallel to the sustaining electrode 64. A first gap exists between the sustaining electrode 64 and a first auxiliary electrode 66. A second auxiliary electrode 68 is also positioned on the surface of the front substrate 62 and parallel to the sustaining electrode 64. A second gap 72 exists between the sustaining electrode 64 and the second auxiliary electrode 68. The second gap 72 is smaller than the

first gap 78, therefore, the firing voltage of the PDP 60 can be reduced.

The sustaining electrode 64 has a first side 641 near the second auxiliary electrode 68 and a second side 642 far from the second auxiliary electrode 68. The third auxiliary electrode 70 is located near the second side 642 of the sustaining electrode 64.

There is no sustaining electrode formed beneath the first 66 and the second 68 auxiliary electrodes. As shown in Fig.5A, two connecting electrode 76 are formed between the first auxiliary electrode 66 and the second [68] auxiliary electrode[s] 68 for electrically connecting the two auxiliary electrodes 66, 68. Besides, the PDP 60 includes a back substrate (not shown) positioned parallel to the front substrate 62, and a plurality of ribs 74 formed on the back substrate 62. The connecting electrodes 76 are positioned in opposite and parallel to the ribs 74 for avoiding the reduction of the transparency of the PDP 60.

Further, the connecting electrode 76 can be omitted for simplifying the fabricating process and increasing the transparency of the PDP 60. The first auxiliary electrode 66 and the second auxiliary electrode 68 will not be connected in the same pixel area, but rather, can be connected in the pad area (not shown) at the edge of the PDP 60.

As shown in Fig.5B, in order to increase the discharge efficiency of the PDP 60, a fourth auxiliary

electrode 67 is further formed on the surface of the front substrate 32. The fourth auxiliary electrode 67 is positioned between the first 66 and the second 68 auxiliary electrodes. A first gap 78 exists between the first auxiliary electrode 66 and the sustaining electrode 64, a second gap 72 exists between the second auxiliary electrode 68 and the sustaining electrode 64, and the third gap 79 exists between the fourth auxiliary electrode 67 and the sustaining electrode 64. The second gap 72 and the third gap 79 are smaller than the first gap 78. The second gap 72, which is the smallest gap, is the discharge gap of the PDP 60.

In this embodiment, a sustaining electrode 64 and plurality of auxiliary electrodes 66, 67, 68, 70 are used for obtaining a smaller discharge gap 72 between the auxiliary electrode 68 and sustaining electrode 64.

Compared with the prior art, the present invention uses the misalignment of two electrodes to obtain a smaller discharge gap. A first lithographic process is first used to form the sustaining electrodes and a second lithographic process is further used to form the auxiliary electrodes on the surface of the sustaining electrodes and near the sustaining electrodes. Therefore, the discharge gap formed by the auxiliary electrode and the nearby sustaining electrode is not limited by the resolution of the traditional exposure tools or the characteristics of the photoresist materials. A smaller discharge gap can be obtained to improve the image quality of the PDP.

Those skilled in the art will readily observe that numerous modifications and alterations of the device may be made while retaining the teachings of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

4. Paragraphs beginning at line 1 of page 19 to line 11 of page 19 have been amended as follow:

--ABSTRACT OF THE DISCLOSURE

An electrode structure of a plasma display panel (PDP) is disclosed. The electrode structure is formed on a front substrate of the PDP. The electrode structure includes a first sustaining electrode, a second sustaining electrode, and an auxiliary electrode. The first and second sustaining electrodes are formed on the substrate with a first gap existing therebetween. The auxiliary electrode is formed in the first gap. A second gap is formed between the auxiliary electrode and the second sustaining electrode. The second gap is smaller than the first gap.--

In the claims:

Claims 1, 7, 9-10, 13, and 16-20 have been amended as follows:

1. (Once amended) An electrode structure of a plasma display panel (PDP), the electrode structure formed

on a front substrate of the PDP, and comprising:

a first sustaining electrode and a second sustaining electrode set on the surface of the front substrate, and a first gap existing between the first and second sustaining electrodes[, the first sustaining electrode having a first side approaching to the second sustaining electrode and a second side far from the second sustaining electrode]; and

a first auxiliary electrode electrically connected to the first sustaining electrode, the first auxiliary electrode comprising a first part and a second part adjacent to the first part, the first part formed in the first gap, and the second part located above the first sustaining electrode[and adjacent to the first side of the first sustaining electrode];

wherein a second gap exist[s]ing between the first part of the first auxiliary electrode and the second sustaining electrode is used as a discharge gap of the electrode structure of the PDP, and the width of the second gap is smaller than the width of the first gap.

7. (Once amended) The structure of claim 21 wherein the second sustaining electrode comprises a third side [far from] not contiguous to the end of the first sustaining electrode, and the electrode structure also comprises a second auxiliary electrode approaching to the third side of the second sustaining electrode.

9. (Once amended) An electrode structure of a plasma display panel (PDP), the electrode structure formed on a front substrate of the PDP, and comprising:

a first sustaining electrode and a second sustaining

electrode formed on the front substrate, and a first gap existing between the first and second sustaining electrodes; and

a first auxiliary electrode formed on the surface of the substrate in the first gap;

wherein a second gap exist[s]ing between the first auxiliary electrode and the second sustaining electrode is used as a discharge gap of the electrode structure of the PDP, and the width of the second gap is smaller than the width of the first gap.

10. (Once amended) The structure of claim 9 wherein the first sustaining electrode comprises a first side approaching to the second sustaining electrode and a second side [far from] not contiguous to the end of the second sustaining electrode, the first auxiliary electrode comprises a first part and a second part, the first part is formed in the first gap, and the second part is located approaching to the second side of the first sustaining electrode.

13. (Once amended) The structure of claim 9 wherein the second sustaining electrode comprises a third side [far from] not contiguous to the end of the first sustaining electrode, and the electrode structure further comprises a second auxiliary electrode approaching to the third side of the second sustaining electrode.

16. (Once amended) The structure of claim 9 wherein the first sustaining electrode comprises a first side approaching to the second sustaining electrode and a

second side [far from] not contiguous to the end of the second sustaining electrode, and the first auxiliary electrode is formed on the surface of the front substrate and adjacent to the first side of the first sustaining electrode.

17. (Once amended) An electrode structure of a plasma display panel (PDP), the electrode structure formed on a front substrate of the PDP, and comprising:

a first sustaining electrode formed on the surface of the front substrate;

a first auxiliary electrode formed on the surface of the front substrate and parallel to the first sustaining electrode, a first gap existing between the first sustaining electrode and the first auxiliary electrode; and

a second auxiliary electrode formed on the surface of the front substrate and parallel to the first sustaining electrode, a second gap existing between the first sustaining electrode and the second auxiliary electrode and being used as a discharge gap of the electrode structure of the PDP, and the width of the second gap being smaller than the width of the first gap.

18. (Once amended) The structure of claim 17 wherein the first sustaining electrode comprises a first side approaching to the second auxiliary electrode and a second side [far from] not contiguous to the end of the second auxiliary electrode, and the electrode structure comprises a third auxiliary electrode adjacent to the second side of the first sustaining

electrode.

19. (Once amended) The structure of claim 18 wherein a connecting electrode is formed between the first and the second auxiliary electrodes, and the connecting electrode is formed on the surface of the front substrate and perpendicular to the first auxiliary electrode.

20. (Once amended) The structure of claim 18, further comprising a fourth auxiliary electrode formed on the surface of the front substrate, the fourth auxiliary electrode formed between the first and the second auxiliary electrodes, a third gap existing between the fourth auxiliary electrode and the first sustaining electrode, and the width of the third gap is smaller than the width of the first gap.

Please add the following claim 21:

21. (New) The structure of claim 1 wherein the first sustaining electrode has a first side approaching to the second sustaining electrode and a second side not contiguous to the end of the second sustaining electrode.

Sincerely yours,

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